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(54) Method for configuring and operating a telecommunication apparatus.

(57) A method for configuring and operating a telecommunication apparatus composed of a first user interface module (800) for handling the communication with an operator, and a teleprocessing module (830) for handling the telecommunication procedures which are involved during the operating of said apparatus, the user interface module being provided with an editor. The method comprises the step of:
displaying in a first window (310) a first set of graphic objects (311-324) being editable by the use of said editor and being associated with a first set of parameters which are representative of the different telecommunication protocols, the telecommunication network and the hardware component comprised in said apparatus, said parameters being loaded in a first file (840) read by said teleprocessing module (830) and which can be updated either by said user interface module (800) or said teleprocessing module (830),
displaying in a second window (330) a second set of graphic objects (331-336) being representative of data and parameters relating to the problem determination procedures in said apparatus, said objects associated with a second file (850) which can be read by said user interface module (800) and can be updated either by said teleprocessing module (830) or said user interface module (800),
displaying in a third window (350) a third set of graphic objects (351-353) representative of the state of said apparatus and associated with a third file (860) which can be read by said user interface module (800) and which can only be updated by said teleprocessing module (830) active in the machine. This results in an increase of the independence between the functional code which runs into the machine and also facilitates the configuration and the operating of the apparatus. That further renders easier the future correction and adaptation of the apparatus and more generally, maintenance operations.

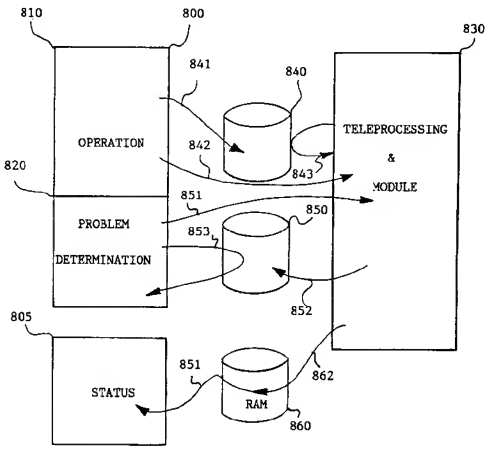

FIG.8

EP 0 602 295 A1

Technical field of the invention

The invention relates to the telecommunication field and particularly to a method for configuring and operating a telecommunication apparatus composed of a user interface module for handling the communication with an operator, and a teleprocessing module for handling the telecommunication procedures which are involved during the teleprocessing operations.

Background art

Integrated Services Digital Network (I.S.D.N) is an international communications standard that makes it possible to deliver multiple services in addition to the normal telephone (voice) service - so that fax, video, data and all kinds of images can be transmitted to a terminal over a single line. The ISDN is provided by public network operators at both national and international levels which offer a choice of Basic or Primary Rate access to the ISDN network. The Basic access (also called 2B + D) provides two 64 Kbps channels for voice or data communications plus one D channel for the controlling and the monitoring of the transmission, giving an aggregate speed of 144 Kbps. The Primary rate (which is called 30B + D) offers up to 30 simultaneous 64 Kbps B channels and one 64 Kbps D channel for an aggregate speed of 2 Mbps.

The performances offered by the ISDN networks, and particularly the throuput provided by the primary rate has allowed the possibility of effective national and internationalcommunications between host computers, either IBM or non IBM, running X25, SNA, TCP/IP or OSI applications, and a wide range of terminal equipments and users. Thus, a wide range of users, who are generally not specialized in the telecommunication field and in the structure and operating of the sophisticated telecommunication equipments, take benefit from the high rates and possibilities of the ISDN equipments.

For instance, the possibilities offered by the ISDN networks have allowed the creation and the development of electronic catalogs and multimedia databases. Electronic images which are stored on a central database can thus be accessed in a few seconds by multiple users within a country or across borders. Electronic and up-to-date catalogs allows the travel agents to show specific resorts and hotels with much more details than using a printed catalog. The tour operators can also take benefit from these possibilities since the update of one single central data base appears easier and cheaper. Also distributers and retailers can demonstrate products clearly whether the items are cars, fashion or technical products, and let users browse through catalogs and place orders directly. Retailers can show a wide variety of models electronically without having to keep the whole expensive range on hand, and additions and deletions are easily handled. The ISDN network allows a set of 30 users to simultaneously be connected to one electronic catalogs.

Further, the possibilities which are offered by the ISDN networks also allow the development of file transfers where software can be downloaded or retrieved from a central host by remote branch office or distribution centers to take advantage of lower tarifs during non-peak hours.

As a conclusion, a wide number of different telecommunication users are allowed to benefit the possibilities which are offered by the ISDN telecommunication primary rate communications, including data, voice, and image transfers by means of a corresponding wide number of telecommunication applications.

This wide number of telecommunications applications which is likely to be developed including travel agency, real estates, retailing and distribution applications- requires that the sophisticated telecommunication equipments or gateways providing the access to the ISDN primary interface be sufficiently simple in terms of customization, configuration, lines connections, directory management and data traffic control so as to be operable by a user who does not have the knowledge of a fully qualified telecommunication engineer.

Summary of the invention.

The problem to be solved by the present invention is to allow a simple operator, who is not particularly qualified in the telecommunication field and particularly the ISDN networks and the multiples connections between ISDN terminals and X25, SNA, TCP/IP or OSI applications running in host computers, to easily configure, operate and control a sophisticated gateway equipment allowing the access to a ISDN primary rate.

This problem is solved by the method for configuring and operating a telecommunication apparatus according to the invention which involves the step of displaying of a Graphic Object Selection (GOS) display which comprises a set of graphic objects associated with files comprising parameters required for the teleprocessing functions performed by the apparatus and particularly defining the parameters of the different layers in the OSI model. With the method of the invention, the different graphic objects are organized in such a manner that the storage memory which is needed for carrying out the multiple teleprocessing communications through the ISDN network, particularly with multiple DTE having different protocols, can be decreased.

In addition to this, the configuration and the day-to-day operating functions are made much easier to the non-experienced operator.

More particularly, the method according to the present invention comprises the step of:

- displaying in a first window a first set of objects being associated with a first set of parameters which are representative of the different telecommunication protocols, the telecommunication network and the hardware component comprised in said apparatus, said parameters being loaded in a first file read by said teleprocessing module and which can be updated either by said user interface module or said teleprocessing module,
- displaying in a second window a second set of graphic objects being representative of data and parameters relating to the problem determination procedures in said apparatus, said objects associated with a second file which can be read by said user interface module and can be updated either by said teleprocessing module or said user interface module,
- displaying in a third window a third set of graphic objects representative of the state of said apparatus and associated with a third file which can be read by said user interface module and which can only be updated by said teleprocessing module active in the machine.

This results in an increase of the independence between the functional code which runs into the machine and also facilitates the configuration and the operating of the apparatus. That further renders easier the future correction and adaptation of the apparatus and more generally, maintenance operations.

Preferrably, the color of each objects are coded thereby allowing the user to instantaneously catch the status of the gateway equipment in a glance.

In a preferred embodiment of the invention, the method according to the present invention comprises two distinctive edition routines, a first routine being associated with steps and procedures allowing the edition and the update of one object by a non qualified operator, and a second routine which is associated with steps and edition procedure allowing a quick edition and update of the corresponding object by an operator having more skill in the use of the system. In this way, the control and the management of the ISDN primary gateway equipment is allowed for a wide range of different users operating the gateway.

Preferrably, the first window consists in a panel comprising a subset of graphic objects representative of the LAPB, PLP, X.25 and SDLC protocols parameters of the terminals which can communicate with said apparatus, whereby the layers 2 and 3 are easily editable and handled by the operator.

In a preferred embodiment of the invention the first window further comprises a graphic object representative of the parameters of the hardware components of the machine further comprising the serial number of the machine, the country where it is located, the control mode of the security access.

Additionaly, the first window displays a graphic object which comprises the list and characterizing parameters of the Data Terminating Equipments (DTE) which are authorized to get an access to the apparatus. Preferrably, the object comprising the parameters of the list of said authorized terminals comprises a logical link to some of said graphic objects representative of the X.25 and SDLC protocols, whereby said apparatus is capable of handling the communication with a numerous set of different terminals.

In a preferred embodiment of the invention, the method allows the configuration and the operating of an ISDN primary gateway allowing the connection of DTE to X.25 host computers.

Description of the drawings

Figure 1 illustrates the technical environment of one ISDN primary gateway which can incorporate the method according to the present invention.

Figure 2 illustrates the basic structure of the ISDN primary gateway which can incorporate the method according to the present invention.

Figure 3 illustrates the Graphic Object Selector (GOS) which is used in the method according to the present invention.

Figure 4a illustrates the edition, in the CURRENT RECORD mode, said also PRIMER MODE, of the different parameters which are associated with the SUBSCRIBER DIRECTORY object 322.

Figure 4b is an illustrative view of the result of the edition of the GATEWAY object 315 which contains the physical parameters of the Personal System/2 workstation which embodies the telecommunication equipment using the invention. A double click operation on the GATEWAY object 315 results in a call of a routine causing the first mode of editing to be used.

Figure 4c illustrates the result of the CURRENT RECORD mode edition action of the X.25 CARDS object 320 containing data characterizing the X.25 line.

Figures 4d, 4e, 4f and 4g respectively show the edition of the LAPB PROFILE object 311, the PLP PROFILE object 312, the X.25 PROFILE object 313 and the SDLC PROFILE object 314 in the simple CURRENT RECORD mode.

Figures 4h and 4i respectively illustrate the edition of the ERROR_LOG file and the in the CURRENT RECORD mode.

Figures 5 illustrates the edition, the LIST mode, said also ADVANCED mode, of the different parameters which are associated with the SUBSCRIBER DIRECTORY, object 322 (same than Figure 4a).

Figures 6 shows the correspondence table between the different graphic objects being used in the Graphic Object Selector and the different actions which are authorized on those data.

Figure 7 illustrates the flow chart of the edition routine of the different graphic objects comprised in the Graphic Object Selector.

Figure 8 illustrates the organization of the user interface module, the general teleprocessing module and the status displaying module, in such a way that each module can operate asynchronously.

Figure 9 illustrates the organization of the software components of the teleprocessing module which is distributed within the different storage of the machines, the adapter cards 211, 220 and 221 and the ISDN primary adapter 222.

Fig. 10 illustrates the initialization process.

Description of the preferred embodiment of the invention.

With respect to the figure 1, there is shown the general technical environment of one ISDN primary gateway equipment 1 which can advantageously incorporate the different technical steps of the method according to the present invention. ISDN primary rate equipment 1 allows different Data Terminating Equipments (DTE), such as a terminal 10, interactive terminal 11, a terminal 12 being connected to a cluster controller of the type IBM 3174 via an ISDN terminal adapter of the type IBM 7820, and also data processing system 13, 14 and 15 of the type IBM RISC System/6000 which are connected to the ISDN network through their associated IBM 7820 terminal adapter, for instance. In one embodiment of the invention, each DTE 10 to 15 being located in different towns, for instance DTE 15 being located in Paris while DTE 14 operates in London and DTE 13 in Munich, and each is provided a 2B + D basic access to their national respective ISDN network, in order to get an access to an electronic database being placed in a host computer 25 of the type IBM 3090 being also located in Paris via a telecommunication controller equipment 21 such as a IBM 3745. Such a telecommunication architecture could be particularly useful in the real estate field where up to 30 different remote DTEs, each one being located in one corresponding real estate agency, can get the access to a centralized database of the houses for sales in Europe, containing a wide and comprehensive description, including data, images and possibly music or voice, from the data base located within Host computer 25 in Paris. It should be noticed that the architecture is not limited to one single host computer 25. The ISDN primary gateway 1 could also provide the access to additional host computers, such as a IBM ES/9221 host 22, a RISC System/6000 host 23 and an AS/400 computer 24.

With respect to the figure 2, there is described now the general architecture of the ISDN primary gateway which uses the method according to the present invention. Gateway 1 comprises a computer 210, which is of the type such as the IBM Personal System/2 8595 - AH9 in the preferred embodiment of the invention, to which is plugged one or two X25 cards 211 for allowing the X.21/V.35 connections to the host computers, and additionally comprises one to four ISDN cards 220 which allows the connection of the computer to a ISDN primary adapter 222. Each of the X25 card 211 or ISDN card 220 is currently available under the reference "IBM Real Time Interface Coprocessor Portmaster Adapter/A" card (RIC) which is marketed by IBM and is well known to the skilled man Shortly, each RIC Portmaster card 211 or 220 comprises its own microprocessor operating with some memory and a Direct Memory Access (DMA) controller, I/O devices etc... That microprocessor is associated with an operating system providing time sharing and priority management. Each RIC Portmaster card is directly connected to the Microchannel Architecture (MCA) bus of the computer 210, which resources are therefore available to all the cards which are plugged into the machine. It should be noticed that in the preferred embodiment of the invention, each X.25 card is a RIC Portmaster card or MOTHER board, on which is plugged a (not shown in figure 2) additional corresponding DAUGHTER card of the type ELECTRICAL INTERFACE BOARD providing the electrical interface, either conforming with the X21 or V35 CCITT Recommendations, that is to say the well known functions corresponding to the layer 1 of the OSI model. Assuming that one Host computer to which the ISDN primary gateway 1 is intended to be connected has a V35 interface, the corresponding RIC Portmaster card 211 will be fitted with a V35 DAUGHTER board card. In the reverse case, i.e. the case of a Host computer communicating through a X21 interface, the RIC Portmaster card will be fitted with a DAUGHTER card matching the CCITT X21 Recommendations. Similarly, each ISDN RIC Portmaster card 220 is fitted with a corresponding ISDN DAUGHTER card 221 which allows the electrical connection to a ISDN primary adapter 222 achieving the Time Di-

vision Multiplexing (TDM) of the 30 B channels whereby the ISDN primary gateway provides the primary access to the ISDN network.

The internal structure of the different RIC Portmaster cards 220 and 221, with their associated DAUGHTER card, and also with the structure of the multiplexing adapter 222 are not part of the present invention and they will not be described with further details. Such details can be shown in European Patent Application entitled "Method for analyzing a set of ISDN adapter cards being plugged in a workstation operating as a ISDN Primary gateway, and apparatus" filed by the same applicant on the same day, the description of which being incorporated by simple reference in this application.

With respect to the figure 3, there will be described now the Graphic Object Selector (panel for managing the operating of the ISDN primary gateway system which is advantageously used in the method according to the present invention.

The Graphic Object Selector panel is composed of a set of 14 graphic objects which are displayed to the user, some of the object are associated to a corresponding file containing information which is needed which allows a quick and efficient configuration and control of the machine, even by an user or an operator which has not a high qualification in the telecommunication environment. As will appear below, the organization of the functional characteristic features of the machine takes advantage of the different relationships existing betwen the internal parts of the machine so that an easy configuration and control of the latter is made possible. In addition the user interface becomes completely independent of the teleprocessing routines.

Generally speaking, the method according to the invention involves the steps of displaying on the GOS the object in a colour-coded manner in order to facilitate the control of the machine. In the preferred embodiment of the invention a green color is used when the configuration data corresponding to one displayed object has been successfully compiled within the machine. In that case, the data will become operational on the next starting of the ISDN gateway. A Yellow color is used for the objects being displayed when the latter correspond to configuration data which requires a compilation. A grey color is used when the object correspond to a physical entity within the machine which is not installed or still has characterizing data which have been removed from the current configuration.

The different objects which are displayed on the Graphic Object Selector (GOS) panel are organized in three distinctive classes, each corresponding to a specific range of functional routines operating in the machine.

Graphic Object Selector (GOS) panel includes a first OPERATION window 310 area which composed of information corresponding to technical characteristics which are needed for the operating of the machine, and particularly the profiles files containing protocol parameters for the terminals which can be attached to the network, gateway files characterizing the network and the computer workstation being the basis for the gateway, the technical data characterizing the different ISDN and X25 cards which are possibly plugged in the workstation, and the ISDN Subscriber directory listing the subscribers which are allow to access to the network.

The graphic objects corresponding to the profile files of OPERATION window 310 consists in LAPB PROFILE object 311, PLP PROFILE object 312, X25 PROFILE object 313 and SDLC PROFILE object 314. LAPB PROFILE object 311 comprises data characterizing the LAPB Link Access protocol, i.e. corresponding to data relative to the Layer 2 in the OSI model, which can be used by the X.25 terminals, and which are well known to the skilled man. Those parameters particular consist in the definition of the window size ie the number of packets which the emitter can send before waiting for an acknowledgement, the size of the frames which are transmitted, the values of timers which are involved in the LAPB procedures etc...

PLP PROFILE object 312 contains the Packet Level Protocol (PLP) parameters for X.25 terminals using these profile, i.e. corresponding to data relative to the layer 3 of the OSI model such as the packet size consisting in the number of bits comprised within a packet etc...

The parameters which are respectively associated with the LAPB PROFILE object 311 and the PLP PROFILE object 312 can be associated by means of an additional object, a so-called X.25 PROFILE object 313 containing the parameters characterizing the links which are used for the X.25 Data Terminating Equipment (DTE). When the operator performs an editing of one X.25 PROFILE object 313, the gateway automatically recalls the parameters contained in LAPB PROFILE object 311 and PLP PROFILE object 312 which are associated to that particular X.25 PROFILE object. This allows the different configurations parameters of the numerous different terminals which are likely to communicate via the ISDN gateway, to be stored with less memory space. Further, this allows an easy and effective manipulation of the numerous parameters is allowed and the configuration of the system is made much easier for the user.

At last, SDLC PROFILE object 314 contains the parameters characterizing the SDLC transmission and reception with the host computer 15 of figure 1 via the ISDN network and the IBM 7820 Terminal

Adapter (TA) illustrated in the same figure.

It should be noticed that the manipulation of those objects above, and other objects below, is facilitated by the monitoring of a double-clicking operation from the user during the edition of one object resulting in the loading of default parameters in the corresponding files.

In addition to the above described PROFILE objects 311, 312, 313 and 314, the OPERATION window 310 comprises a set of seven objects which characterize the configuration of the personal computer which embodies the ISDN primary gateway.

A GATEWAY object 315 comprises the parameters which are specific to the gateway apparatus being used: they particularly define the ISDN number of the machine, the country where it is located, the type of the ISDN network which is used, the control mode of the security access which is involved etc... GATEWAY object 315 can be manipulated by the user by means of the two following operations STOP_GATEWAY and START_GATEWAY which respectively causes the machine to be stopped or started as explained below. The manipulation of the GATEWAY object 315 is achieved as follows: the machine monitors the selection of this object by the user, that selection resulting in a highlighting of the object on the display, also with the displaying on a dedicated area on the display of a menu bars of the two actions START_GATEWAY and STOP_GATEWAY which are allowed to the user. Then, the gateway performs an additional monitoring of either a further selection of the GATEWAY object 315 or the selection of one among the two actions STOP_GATEWAY or START_GATEWAY which are displayed within the Graphic Object Selector (GOS). If the latter monitoring detects that the user has performed a second selection of the GATEWAY object 315, when a edition routine is called which allows the user to edit the corresponding object and address the parameters therein included. In the case where the latter monitoring operation results in the detection of the selection of the OPERATION action, then the start or conversely the stopping of the gateway can be performed by the user by means of an appropriate selection on one menu bar.

Four additional objects 316-319 respectively correspond to the different ISDN adapter cards which can possibly be plugged within the computer 1 of the figure 1. These objects are associated with configuration data. Those four objects 316-319 can be manipulated by the user only by means of two distinctive operations, a first CREATE and a second DELETE operation. Similarly to above, when the user selects one among the four objects 316-319, the gateway program performs the displaying of corresponding menu bars associated with the CREATE and DELETE operations which are authorized. Then, the program enters in a monitoring process where it detects either a second selection of the same object which was already selected, in which case the latter can be edited, or the selection of one among the two authorized CREATE or DELETE operations. When the operator clicks the CREATE menu bar which is displayed within the Graphic Object Selector (GOS), the object 316-319 which has been currently selected can be created and the appropriate parameters which corresponding to the considered ISDN cards can be stored. The gateway then performs a change in the color of that object which turns to yellow. A further change in the color will occur after the compilation of the parameters of this object, and the latter will then turn to green if the compilation succeeds. When the operator clicks the DELETE menu bar which is displayed within the Graphic Object Selector (GOS), the object which has been currently selected can be conversely deleted, then resulting in the latter having its color turning to grey. This indicates to the operator that the corresponding ISDN card has been or will be removed from the computer before the occurrence of the next Initial Program Loading (IPL) procedures.

The ISDN primary gateway apparatus is also characterized by two additional UP-STREAM_X.25_CARDS objects 320 and 321 which are each associated with a file containing parameters which define the 12 lines which can be used for the connection of the ISDN primary gateway to the two host computers. For a given line, those parameters particularly comprises the logical name of the line, the port number which is used for this line, the X.25 address of the up-stream X25 DTE 21 which is connected to this line, the X25 profile of the SDLC profile which is involved ie a pointer to one among the objects 313 and 314, etc...

OPERATION window 310 further comprises a ISDN SUBSCRIBER DIRECTORY object 322 which is associated to a file including the list of the ISDN subscribers which will be allowed by the gateway to access a given application running within one of the host computers 22, 23, 24 or 25. The parameters contained in the ISDN SUBSCRIBER DIRECTORY object 322 particularly comprises the ISDN number and the extension number Called Party Subaddress (CPS) used in the ISDN communication, the ISDN and X.25 addresses of the subscriber, its terminal type (either X.25 or SDLC), the appropriate profile ie a pointer to the appropriate PROFILE objects 313 or 314. As mentioned above, the method for controlling the configuration of the ISDN gateway according to the present invention takes benefit of the different relationships existing

between the different, numerous and parameters which are involved during the customization and day-to-day operating procedures of a sophisticated apparatus such as a ISDN Primary gateway device. This first allows the use of a limited amount of storage memory since the organization of the objects which is described takes advantage of the relationship between those parameters and prevent redundancy. In addition to this, the configuration and operating of the sophisticated ISDN primary gateway apparatus is made much easier for the non-experienced operator.

OPERATION window 310 also comprises a BACKUP object 323 which has the shape of a diskette. The manipulation of this BACKUP object 323 provides save and restore functions for the configuration parameters which are associated with objects 311, 312, 313, 314, 316, 317, 318, 319, 320, 321 and 322. The implementation of such store and save functions is well known to the skilled man will therefore not be described with further details.

An additional COMPILE ERROR object 324 allows the display of the compilation errors or incidents which might have occurred during the initialization of the machine. The compilation process of all the files associated with the above objects provides a set of corresponding binary files which will be used by the teleprocessing and operating code and routines in the machine. During the compilation of the files containing the above described parameters associated with the objects contained in the GOS 310, tests are performed in order to detect incompatibility between the different files associated with their corresponding objects. For instance, the operator might have keyed the same ISDN number for two distinctive DTE during the edition process of SUBSCRIBER DIRECTORY object 322. The compilation process of the files that are associated with corresponding graphic objects, that compilation being performed prior to the general operating of the machine ie the teleprocessing functions, involves a serie of test procedures which purpose are the detection of such incompatibily in the data that a non-experience might introduce. When an error in the compilation has been detected, this information is recorded and made available to the user by means of the graphic COMPILE ERROR object 324.

The Graphic Object Selector (GOS) also includes a second PROBLEM DETERMINATION window which comprises a set of six distinctive graphic objects, a so-called ERROR LOG object 331, a STATISTICS_LOG object 332, a PS/2_INTERFACE object 333, a ISDN_IB_MEMORY object 334, an ISDN_DTE object 335, and an X.25 LINE object 336.

ERROR LOG object 331 and STATISTICS_LOG object 332 are associated with files recording some events which are useful for statistical purposes and the management of errors incidents which might have occurred on the lines and which were reported by the ISDN primary gateway apparatus, e.g. the occurrence of a transmission incident which might occur on one among the 30 ISDN links, and generally speaking any hardware or protocol errors or failures which have been reported to the gateway. STATISTICS LOG object 332 allows the browsing of protocol statistics, ie the number of sessions which have been established between two determined instants etc... The two files which are respectively associated with ERROR LOG object 331 and STATISTICS object 332 are a EVENT LOG file and a ERROR LOG file which can be browsed by means of two successive clicking operations on the mouse which are operated by the operator.

PS/2_INTERFACE object 333 can be manipulated by means of the mouse and provides the initiating of a trace operation, i.e. the storage in memory, for analysis purpose, of the 54 first bytes of every frame of data which goes through each CIB interface card 221 of the figure 2. ISDN_IB_MEMORY object 334 can also be manipulated by means of the mouse controlling the machine and provides the dumping, i.e. the storage in memory of the contents of the memory located within each CIB card 221. This facilitates the maintenance operations since the main computer can obtain an instantaneous state of the different RIC cards 220 and their associated CIB cards 221.

The two last objects of PROBLEM DETERMINATION window 330 allows the possibility to start trace operation on specific lines. To achieve this, assuming that the operator clicks object 236 relating to a X25 line for instance, a routine is called which requests that the operator select a specific line. Then, when the latter selection has been completed, the gateway apparatus performs a trace, i.e. records in a determined file the data flow which is transmitted through this specific line. Similarly, when the operator clicks object 235 associated to the ISDN lines, a routing is called which requests that the operator enter a specific ISDN subscriber number, and then the corresponding data flow on the B or D channel is recorded. Therefore, it should be noticed that, in addition to the advantage already mentioned above ie the possibility of obtaining in one unique file an instantaneous state of the numerous cards which are plugged within the machine, the possibility of tracing a specific X25 or ISDN line provides the possibility to coordinate the numerous cards and subparts of the sophisticated ISDN gateway. Such features allow an easy maintenance of the whole

system and also provide the possibility to embody a sophisticated telecommunication product such as a ISDN primary gateway apparatus with a general purpose computer having the appropriate and multiple cards.

At last, the Graphic Object Selector (GOS) comprises a third window which provides in real time the state of the different hardware parts of the machine and also that of the different operational teleprocessing procedures which are currently performed. In the preferred embodiment of the invention, the third window, called GATEWAY_STATUS window 350. This third window comprises a first indicator, consisting in an object 351 which purpose is to inform the operator of the status of the ISDN primary gateway apparatus, being either STOPPED, or STARTING, or RUNNING, or STOPPING. A STOPPED indication informs the operator that no data are being passed through the gateway, while a RUNNING indicating reveals on the contrary that the gateway receives and transmits data. If object 351 indicates a STARTING message, then the operator is made aware that the machine has entered in an initialization procedure prior to the performing of any teleprocessing operations. When the object 351 indicates a STOPPING message, the operator is made aware that the machine has initiated a end-of-session procedure.

An additional object 352 indicates the status for each RIC communication adapter card 220. For this purpose, and to facilitate the operating of the machine, a color code is used for the definition of each status. In the preferred embodiment of the invention, a green color characterizes one card which is ready for transmitting and receiving data. A grey colour is used informing the operator that the corresponding RIC adapter card is not configured or still is not present in the slot, while a red color is representative of the occurrence of a hardware failure. Similarly object 352 comprises two indicator X1 and X2 which are representative of the state of the two X.25 upstream cards (211).

The third window of Graphic Object Selector (GOS) further comprises an graphic indicator 353 which indicates whether trace operations are currently performed. As mentioned above, such trace operations are the result of a TRACE command which is selected in association with one among the graphic objects 333, 335 and 336.

A DUMP graphic object 354 is used for informing the operator that a dump operation has been requested by the manipulation of the object 334 and is currently performed.

To improve the configuration and day-to-day operating procedures, particularly for the non-experienced operators, the graphics objects which are associated with files containing parameters are provided with the following edition facilities. Indeed, the PROFILE graphics objects 311, 312, 313 and 314, the X.25 adapter card objects, 320 and 321, the SUBSCRIBER_LIST object 322, the COMPILE_ERROR object 324, and the ERROR_LOG and STATISTICS_LOG files are provided with two distinctive modes of displaying the records according to the skill of the operator. A CURRENT RECORD mode is first provided which causes the simple display of all the different records or parameters which are associated with a given graphic object being edited. This mode can also be advantageously used when updating the different records which are associated with the considered graphic object. Figures 4a to 4i are illustrative view of the use of this first mode.

However, for operators having a higher level of experience or skill in the manipulation of parameters and data relating to the telecommunication transmission, there is provided a second mode of edition, called a LIST_OF_RECORD mode which results in the simultaneous display of the records associated with the edited objects for all the items. Figure 5 illustrates the LIST_OF_RECORD edition mode on the SUBSCRIBER DIRECTORY object 322, resulting in the display of a set of row comprising records arranged in column, one row being dedicated to one subscriber and one column of one given row containing one parameter of the considered subscriber.

Figure 6 illustrates the chart giving the associations between the different actions and each graphic object being displayed in the Graphic Object Selector (GOS) and the different operations available. This chart shows the four following actions, i.e. EXIT, COMPILE, PASSWORD, DISPLAY STATUS, and HELP actions, the latter resulting in the display of a help facilities messages. The COMPILE action allows the checking of the validity of the data which were keyed in by the operator and stored in each object's file, and compiled in order to generate the executable code. The PASSWORD action allows the management of password and other security facilities, and at last the DISPLAY STATUS initiates a specific routine causing the general program to display the internal status of the machine as will be described hereafter. The chart also indicates that some actions are available only for some determined graphic objects: the RELOAD action, resulting in the gateway being reconfigured with the default parameters, the already mentioned START and STOP actions are available for the GATEWAY object 315. Also the TRACE action is only available for the PS/2 INTERFACE object 333, ISDN DTE object 335 and X.25 LINE object 336. Three actions NEW, OPEN and DELETE are available for objects which are associated with a configuration file. However, the BACKUP object 323 is not manipulable by means of the

NEW, OPEN or DELETE actions. ERROR_LOG object 331 and STATISTICS LOG object 332 can only be read or deleted by the operator; however, they can not be created since the associated files are generated by the operational teleprocessing routines running in the machine. The COMPILE ERROR object 324 is created during a compilation process of the whole configuration files which results in the detection of incompatibility between the data which are recorded in different files. The COMPILE ERROR object 324 will be erased after the next successful compilation.

An OPEN Action is available on the graphic objects which are associated with a file, i.e. objects 311-322, 324, 331 and 332. Double clicking being performed by the operator on such an object (the two clicking being performed in less than 500 millisecond) results in the OPEN action being performed on this object. Consequently, the first RECORD edition mode is initiated which allows the operator to update the file being associated to the edited object. It should be noticed that in the preferred embodiment of the invention, the same result can be obtained by means of a different procedure. After a first click being performed on a given object, the operator can select the FILE action which is proposed in the menu bar being simultaneously displayed with the GOS. On the occurrence of the FILE action, the software causes a submenu being displaying comprising the OPEN action which the operator can select. This submenu only comprises the appropriate action which are authorized for the considered graphic object which was selected by the operator. This is achieved by using a correspondence table stored within the memory storage affected to the user interface program and which causes only the available actions being displayed on the display and selectable by the operator.

The edition routine which is used in the method according to the present invention permits the operator to manipulate the files associated with some graphics objects by means of well known COPY, DELETE, DUPLICATE and CREATE operations, also operations for the manipulation of data, and at last the SAVE or EXIT well known file management operations. In addition to these, the edition routine is provided with some SEARCH and SORT facility functions. The management of the different files, either the configuration files and the day-to-day operations files which are required for the general teleprocessing operations is based on a set of two different files, a first FILE DEFINITION file associated with corresponding DATA files. The FILE DEFINITION file comprises a template characterizing all the different fields which are used for a considered file, particularly the name of the field, the type (numeric data or alphanumeric data), the range of possible values, the relationships between the different values or parameters between the different fields etc... For instance, the graphic object 320 is associated with a file having template comprising a CLOCK field may have two states: either EXTERNAL if the clock is externally provided or, on the contrary INTERNAL in the case where the clock is internally generated. Assuming that the clock is externally provided, the value of the speed which will be used will have to be comprises within a predetermined ranges of values which is stored in the FILE DEFINITION file. Similarly, in the case of an INTERNAL clock generated in the machine, the value of the speed will have to be chosen among a list of values which is also stored in the FILE DEFINITION file. With respect to the figure 4a, the SUBSCRIBER DIRECTORY file will have a FILE DEFINITION file comprising the definition of a template consisting of a first field named TIME STAMP, a second field entitled ISDN NUMBER, a third field called ISDN CPS etc... The FILE DEFINITION file also comprises the test procedures and routines which ensure the integrity of data and which will prevent the operator from keying erroneous data. The FILE DEFINITION file is used by the user interface program when the operator wish to create a new file corresponding to a given object, in our case the SUBSCRIBER DIRECTORY object 322. Then, when the operator keys the different parameters which will be used for the updating of that file, the user interface program checks the data and stores them in the data file which is associated with the considered FILE DEFINITION file. Therefore, the definition of the file and the template (which are contained in the FILE DEFINITION file) are clearly separated from the data which are necessary for the teleprocessing functions. This first results in a higher flexibility of the software program which can be maintained or modified more easily. In addition to this, since the FILE DEFINITION file comprises the test routines for the checking of the data, when the operator is entering data within the system, a first checking of that data can be immediately performed independently of the further checking operation which will occur during the above mention compilation process. Therefore the configuration and the use of the telecommunication equipment is made much easier, even for a non-experienced operator who can immediately be informed of the erroneous data he might have entered in the machine.

With respect to figure 7, there is shown a flow chart illustrating the different technical steps which are involved by the user interface method according to the present invention when the operator manipulates a graphic object which is associated with a file. On the selection of a given graphic object, also with the selection of the OPEN action,

the user interface routines look in the FILE DEFINITION file and the DATA FILE which correspond to the considered object, step 710. Then, step 720, the user interface program displays the contents of the different fields and records of the object in the default mode of presentation. Then, the user interface program monitors a further request from the operator which can be either a request for VIEW, or data modifications, or still the other actions which were already mentioned above.

Assuming that the user has requested a VIEW action, step 730, then the user interface program causes a window to be displayed in which a selection for either the RECORD presentation mode or the LIST presentation mode is proposed to the user, step 732. As mentioned above, if the user requests that the user interface program uses a RECORD presentation mode, the latter program will display the different records of the considered objects as illustrated in figure 4a to 4i, step 733. In the reverse case, the user interface program will display the contents of numerous items associated with the considered objects arranged in a set of rows and columns such as illustrated in figure 5, step 734. In both cases, the process then proceeds to step 720 again.

If the operator has requested that a manipulation action be performed on the records, either a COPY, DELETE, DUPLICATE or CREATE, those are performed in step 760 and the process proceeds to step 720 again.

In the case of a HELP request, step 750, the user interface program displays a help panel which comprises general information relating to the use of the edition functions. Then, the process returns to step 720.

If the operator has requested SEARCH or SORT operations, step 770, the user interface programs displays a interactive dialog box which allows the user to define the parameters which will be used for the search or sort investigations. The process then returns to step 720.

In the case where the operator has requested that the data of the records be accessed, step 740, then the user interface program calls a routine which will read the contents of the FILE DEFINITION in order to extract all the data characterizing the record, also with the test procedures, which are associated to the record of the template being accessed, step 742. The test procedures assure that the data which are keyed by the operator are valid. Then, the user interface program monitors a further request for the operator. If the latter request a HELP action, step 743, then the user interface program displays a contextual help panel in order to give prompt or help message step 744, which is adapted to the considered record or field being accessed since the contents of the latter contextual help message has been extracted from the FILE DEFINITION file associated with the considered object. The process then returns to step 742. On a DATA ENTRY request, step 747, the user interface program will use the test procedures which were stored in the FILE DEFINITION file for checking the validity of the data which was entered by the operator. This checking particularly comprises the testing of the type of data, either numerical or alphanumerical, and in the former case the value to determine whether it is comprised in the appropriate range of values which are defined in the FILE DEFINITION file. If the test procedure succeeds, then the user interface program authorizes the updating of the contents of the DATA FILE associated with the considered object, step 748. In the reverse case, the user interface program provokes the displaying of an appropriate error message which is also extracted from the FILE DEFINITION file. Then, the process returns to step 720.

If the operator has requested a FILE action, step 780, the different management functions which are available for the considered object are displayed to the operator, who can then select and validate the appropriate one. The user interface program then stores the DATA FILE associated with the considered record and returns to the display of the Graphic Object Selector (GOS) panel.

With respect to figure 8, there is illustrated the organization of the different components of the user interface module and the teleprocessing modules. As shown in the figure, the relationship between the different modules are organized in such a way that assures a wide asynchronousness between the different tasks which are performed by each module. This also provides a high independence between the user interface module, which must remain simple enough to be operated by low skilled operators, and the highly sophisticated teleprocessing routines which embody the operational functions of the ISDN primary gateway. In the preferred embodiment of the invention, a first software module 800 comprises the set of user interface routines which was described above for the management of the different graphic objects which are displayed in the OPERATION and PROBLEM DETERMINATION windows of the Graphic Object Selector (GOS). Module 800 particularly comprises a OPERATION submodule 810 for achieving the management of the graphic objects of the OPERATION WINDOW 310 in figure 3 and a PROBLEM DETERMINATION submodule 820 for handling the management of the graphic objects of PROBLEM DETERMINATION window 330. In addition to module 800, there is provided a STATUS module 805 for handling the display and the management of the graphic objects of the STATUS window 350 of figure 3.

An additional module 830 comprises all the different operational routines which carry out the sophisticated teleprocessing functions of the ISDN primary gateway, e.g. the teleprocessing operation which are involved when a remote ISDN DTE requests the access to an application program running in a X.25 host computer.

The relationships and the communications between the different modules are as follows. User Interface module 800 exchanges data with teleprocessing module 830 via a first set of files 840. Files 840 contain the validated and compiled data corresponding to the graphic objects of the OPERATION window 310. As mentioned above, when the operator updates some objects of OPERATION window 310, the associated files are updated and compiled in order to generate executable data which are stored in file 840. This operation is represented in figure 8 by arrow 841. It should be noticed that, as described below, the compilation of the updating data is always preceded by a set of test and checking procedures to assure that no incompatible data can enter into the teleprocessing module, thereby assuring that even an operator having low -experience in teleprocessing field can operate the gateway. Arrow 842 stands for a set of determined actions which the operator can use for calling some routines comprised in teleprocessing module 830. For instance, if the operator requests a START action, the teleprocessing operational code initiates a routine which causes the contents of configuration files to be loaded in the memory storage available to the teleprocessing module 830, which is then followed by the initialization of the X.25 and ISDN adapter cards 220 and 211 of figure 2 as will be explained below with details. That operation is illustrated in figure 8 by means of arrow 843. In the case of a RELOAD command, the teleprocessing module 830 calls a routine (the action of which being also represented by arrow 843) which causes the contents of configuration files 840 being loaded again in the operational memory storage which can be accessed by module 830. The clear separation existing between the user interface module 800 and the teleprocessing module 830 allows, in addition to the already mentioned increase in the facility of use, the possibility for the operator to update the configurations files 840 by manipulation the appropriate graphic objects displayed on the Graphic Object Selector (GOS) without interfering with the teleprocessing process which is currently operating. This further prevents the operator from spoiling the current telecommunication process by mistake.

Arrow 851 represent the TRACE and DUMP actions which the operator can initiate by means of the manipulation of the appropriate graphic objects of PROBLEM DETERMINATION window 330. Those TRACE and DUMP actions entail a call of some routines in teleprocessing module 830 which will result in the append of a set of files 850, as illustrated arrows 852. Arrow 852 also corresponds to the append of the files 850 when the teleprocessing module 830 reports some incidents which will be reported to the operator via the ERROR LOG graphic object 331 of PROBLEM DETERMINATION window 330, or still when the teleprocessing module 830 reports some statistical data which will be made available to the operator by means of STATISTICS graphic object 332.

Similarly, the STATUS window 350 of Graphic Object Selector (GOS) is periodically refreshed by means of an exchange of data between STATUS module 805 and the teleprocessing module 830 via shared memory segment 860. In the preferred embodiment of the invention, every second, the teleprocessing module 830 updates the contents of the memory segment 860 located within the RAM storage of the PS/2, as illustrated by arrow 862. Its contents can thus be transferred into STATUS module 805, as represented by arrow 861, and be displayed to the operator in the window 350.

Figure 9 illustrates the organization of the different software submodules which are comprised in teleprocessing module 830 and their location in the different storages in the machine. Teleprocessing module 830 comprises a set of teleprocessing routines which cooperate together and which are distributed inside the PS/2 workstation, the ISDN RIC adapter cards 220 with their corresponding CIB card 221, the X.25 RIC adapters 211, and the ISDN primary adapter 222. A first module 940 comprises a set of routines which are located in the main storage of the workstation, and consisting of a INIT module 941 for the performing the initialization of the machine, as will be described hereinafter, a SUBSCRIBER CONFIGURATION module 942, a Logical Circuit Management (LCM) module 943, an ERROR management module 944 and a ADAPTERS INTERFACE module 945. SUBSCRIBER Configuration table 942 comprises the set of configuration tables of the gateway which corresponds to the compiled filed 840 of figure 8. LCM module 943 provides the management of the establishment and disconnection of the virtual circuits for the X.25 links through the gateway. In particular, when the gateway receives a request from a DTE for establishing a link, LCM module 943 looks in the configuration table 942 to check whether the requesting DTE is authorized to access the network. LCM module 943 also searchs the parameters of the requesting DTE which were entered by the operator by means of user interface module 810 and the manipulation of the SUBSCRIBER DIRECTORY 322. Because of the logical relationship between object 322 and the profile graphics objects X.25

PROFILE object 313 and ISDN PROFILE object 314, the LCM module can automatically retrieve the characteristics parameters of the level 2 in the OSI model which will be used by module 950 located in the adapter cards.

An ERROR MANAGEMENT module 944 comprises the routines which provide the detection and the storage of the protocol errors, and hardware failures which might be detected by the machine and be reported to the operator via the user interface module 800.

An ADAPTER INTERFACE module 945 provides the routines for carrying out the interface between the Personal System/2 workstation and the different interface cards which are plugged in the later, via the Micro Channel Architecture (MCA) bus. Module 945 particularly manages the access to the different B channels , and to the X.25 link via the MCA bus. Module 945 also performs the transfer to the lower module 950 and 980 of the data and variables which are associated with the objects defining the protocol characteristics: X.25 protocol (LAPB and PLP) or SDLC as described hereinafter with respect to the figure 10.

A module 950 which is stored in the storage of the ISDN adapter card 220 (associated with its CIB card 221) comprises the different routines of the layer 1, 2 and 3 which are necessary for the establishment and the management of 8 ISDN channels. Each card 220 manages up to 8 different B channels or 7 B channel plus one D channel. In that case, and as fully described in the above mentioned patent application, the D channel is managed by the first PORTMASTER card 220 which is defined during the initialization procedures of INIT module 941. The management of the D channel is performed by means of the Q.931 module 951 and LAPD module 952 which are stored in the PORTMASTER card mentioned above. The B channels are handled by the Packet Layer Protocol (PLP) module 959 and LAPB module 954 which achieve the different functions which correspond to the layer 2 and 3 of the OSI model. The definition of the functions which are involved in the Q.931, PLP, LAPB and LAPD module above are well know to the skilled man and are not part of the present inventions. They will not be described with further details. In order to handle the possibly DTE conforming the SNA standard, a SDLC module 955 provides the layer 2 function which is specific to this standard. Layer 1 functions are distributed between a module 956 stored in the ISDN adapter card 220 and a CIB module 960 which is stored in CIB card 221. Therefore, each CIB card becomes capable of handling 8 B-channels which are multiplexed by means of CIB module 960 associated with module 970 located in the ISDN primary adapter 122.

Now considering the case of a X.25 adapter card 211. Each card has a module 980 which consists in functions of layer 1, 2 and 3 of the X.25 protocol. Similarly to above, the functions of the layer-1 are distributed in two distinctive modules, a first module 983 and a EIB module 984 stored inside the X.25 adapter card 211.

Each X.25 card is capable of handling up to 6 X.25 links. Similarly, to above, during the initialization procedures of the machine which are performed by INIT module 941, module 945 search in the configurations tables the data and parameters stored in file 840, which the operator have entered by the manipulation of the X.25 CARDS AND LINE object 320. Those data and parameters define the layer 2 and 3 characteristics of the line which are necessary for the management of the X.25 links.

More details about the technical operations which are performed and which allows the workstation and their numerous cards which are plugged therein to cooperate together in order to achieve the management of ISDN primary channel can be found in the above referenced patent application which is filed by the same Applicant.

With respect to figure 10, there is illustrated the different technical steps which are involved during the initialization procedure of the ISDN primary gateway.

After the power-on of the machine, step 1000 or still after a reset, INIT module 941 performs a reset of all the PORTMASTER adapters which are plugged inside the Personal System/2 workstation, both X.25 and ISDN, step 1001. This causes each adapter card to perform in internal reset operation of all their internal components, particularly the reset of the memory storages and the initiating of the internal test procedures. Also, the daughter cards 221 and the ISDN primary adapter are reset. After this reset, INIT module 941 searches the parameters loaded in the configuration tables of module 942, the definition of the upstream X.25 links and the profiles which are associated, step 1002. If the latter parameters are lacking in the files 840, then INIT module 741 causes a welcome panel to be displayed to inform the operator that the user interface module 800 is available for entering the data, step 1003. The configuration tables can then be created, by means of the manipulation of the appropriate graphic objects, then followed by the compilation process of the associated files according to the process described above, step 1004. The completion of the configuration tables generation process can then be followed by a START GATEWAY command entered by the operator which will render active the teleprocessing modules 830 inside the machine.

However, in the case where the configuration tables were already existing and compiled in file

840, then graphic object 351 in STATUS window 350 is activated to inform the operator that the initialization of the gateway is in progress. In the preferred embodiment of the invention, the color Of the graphic object 351 is turned to yellow. Then, ADAPTER INTERFACE module 945 performs the loading of the appropriate teleprocessing modules in each of the adapter cards, X.25 or ISDN, step 1005. For instance, in the case of a X.25 card, module 945 transfers the layers 1, 2 and 3 complying with the X.25 protocol in this adapter as illustrated in figure 9. Therefore, the needed information which are contained in the files associated with X.25 LINE AND CARDS graphic object 320 are transferred from files 840 in the memory storage of the X.25 adapter cards, so that they become available for the PLP module 981 LAP_B module 982. Similarly, the data and parameters loaded in files 840 which are associated with the characteristics of PROFILE objects 311 and 314 are transferred by ADAPTER INTERFACE module 945 in the ISDN cards. The technical steps which are involved for the transferring of code between the different cards are not part of this invention and they will not be described with more details. However, those can he found in the description of the above mentioned patent application which description is herein incorporated by simple reference. Then, step 1006, a test is performed to check the success of the above data and parameter code transfers. In the case where one of the different transfers of the parameters in the adapter cards have failed, a error message is displayed to alert the operator, step 1007. In the reverse case, a INIT OK message is transferred from the INIT module 941 of module 830 in file 850, as represented by arrow 852, step 1008. Consequently, the user interface module 800 which has access to file 850, as represented by arrow 853, can log the success of the initialization procedures. Also, as illustrated by arrow 862, the memory segment 860 used for the display of the STATUS window 350 is updated to inform the operator at the next refresh of the STATUS display that the initialization procedures have succeeded, step 1009. Therefore, the operator having a low level of skill is immediately made aware of the success of the operation and can proceed further with the operation of the gateway, while a logging of all the events is still kept in the file associated with the ERROR LOG object 331 so that to keep an history of the events which might be useful for the maintenance in case of possible problems.

Then the gateway proceeds to the operational mode in step 1010. To achieve this, all the X.25 computers must be operational and then, the gateway waits for the first request coming from a DTE or from an X.25 server.

When an ISDN terminal calls in, the gateway checks whether the considered terminal has been registered in the ISDN SUBSCRIBER DIRECTORY.

The request transmitted by the DTE is received through the D channel and is processed by LCM module 943 which performs a search operation in the configuration tables of Module 942 to check whether the requesting DTE is authorized to get access to the application. In the case where the requesting DTE is not registered in the file 840 accessed by module 942, the call requested is rejected. In the reverse case, the call request is transmitted to the X.25 application running in the upper host computer 25 for instance. In the configuration tables loaded in file 840, the teleprocessing routines searches the parameters which are associated to the considered requesting DTE, i.e. its type (X.25 or SDLC) and also its associated profile. If the DTE is of X.25 type, then the profile is characterized by the LAP_B and PLP parameters which the operator have entered in the machine by means of the manipulation of objects 311, 312. If the DTE is of the SDLC type, then the profile is characterized by the parameters loaded in the files associated to object 314. These profiles are dynamically allocated to the B channel which is affected to this terminal. Therefore, each of of the 30 B-channels has the possibility to receive specific profile parameters. Then the gateway waits for the acknowledgement from the host computer in order to establish the point to point communication between the host and the requesting DTE. From this instant, both application programs of the layer 4 to 7 of the OSI model which run in the requesting DTE and the host computer can exchange data, images etc...

Claims

1. Method for configuring and operating a telecommunication apparatus composed of a first user interface module (800) for handling the communication with an operator, and a teleprocessing module (830) for handling the telecommunication procedures which are involved during the operating of said apparatus, said first user interface module comprising an editor, said method involving the steps of:
   displaying in a first window (310) a first set of graphic objects (311-324) being editable by the use of said editor and being associated with a first set of parameters which are representative of the different telecommunication protocols, the telecommunication network and the hardware component comprised in said apparatus, said parameters being loaded in a first file (840) read by said teleprocessing module (830) and which can be updated either

by said user interface module (800) or said teleprocessing module (830),
displaying in a second window (330) a second set of graphic objects (331-336) being representative of data and parameters relating to the problem determination procedures in said apparatus, said objects associated with a second file (850) which can be read by said user interface module (800) and can be updated either by said teleprocessing module (830) or said user interface module (800),
displaying in a third window (350) a third set of graphic objects (351-353) representative of the state of said apparatus and associated with a third file (860) which can be read by said user interface module (800) and which can only be updated by said teleprocessing module (830) active in the machine,
Whereby said user interface module (800) and said telecommunication module (830) operate asynchronously.

2. Method according to claim 1 comprising the step of displaying each of said object in a in a color-coded manner in order to facilitate the control of the machine by an operator.

3. Method according to claim 1 or 2 characterized in that said user interface module (800) is provided with a first edition routine based on a RECORD edition process, and a second edition routine which is based on a LIST OF RECORD edition process giving a comprehense view of the contents of the object.

4. Method according to claim 1 or 3 characterized in that said displaying step of said first window further comprises the step of displaying a panel comprising a subset of graphic objects representative of the LAPB, PLP, X.25 and SDLC protocols parameters of the terminals which can communicate with said apparatus, whereby the layers 2 and 3 are easily editable and handled by the operator.

5. Method according to claim 1 or 4 characterized in that said displaying step of said first window further comprises the step of displaying a graphic object (315) associated with the parameters of the hardware components of the machine further comprising the serial number of the machine, the country where it is located, the control mode of the security access.

6. Method according to claim 5 characterized in that said displaying step of said first window further comprises the step of displaying at least one graphic object (322) comprising the parameters of the list of terminals with are authorized to get an access to said apparatus.

7. Method according to claim 4 and 6 characterized in that said object comprising the parameters of the list of said authorized terminals comprises a logical link to some of said graphic objects representative of the X.25 and SDLC protocols, whereby said apparatus is capable of handling the communication with a numerous set of different terminals.

8. Method according to any one of the preceeding claim characterized in that said displaying step of said second window further comprises the step of displaying a graphic object (331) representative of the error or failure incidents which are editable by said operator.

9. Method according to any one of the preceeding claim characterized in that said displaying step of said second window further comprises the step of displaying a graphic object (332) representative of statistical data which can be edited by said operator.

10. Method according to claim 1 to 3 characterized in that said apparatus is an ISDN primary gateway allowing the connection of DTE to X.25 host computers.

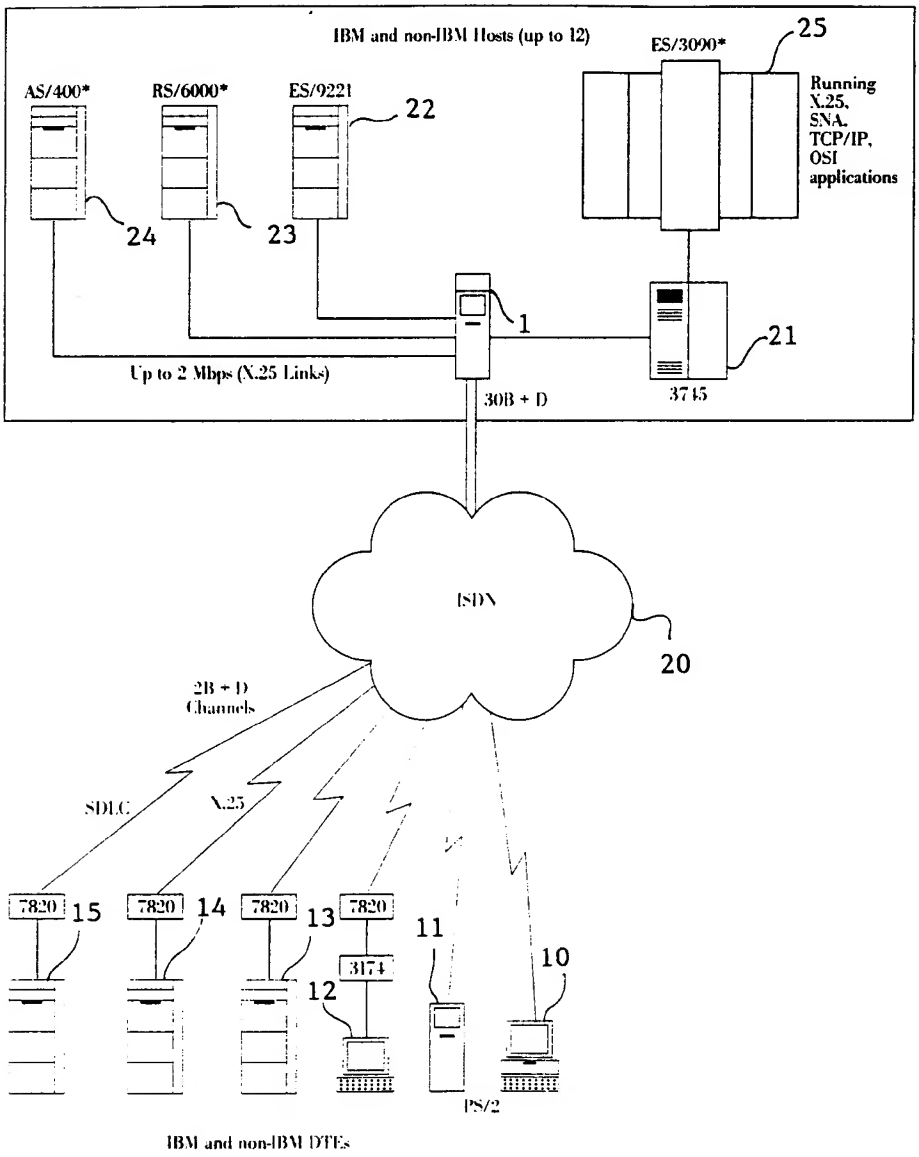
IBM and non-IBM Hosts (up to 12)
ES/3090*
25
AS/400*
RS/6000*
ES/9221
22
Running X.25, SNA, TCP/IP, OSI applications
24
23
1
21
Up to 2 Mbps (X.25 Links)
30B + D
3745
ISDN
20
2B + D Channels
SDLC
X.25
7820
15
7820
14
7820
13
7820
3174
12
11
10
PS/2
IBM and non-IBM DTEs

FIG. 1

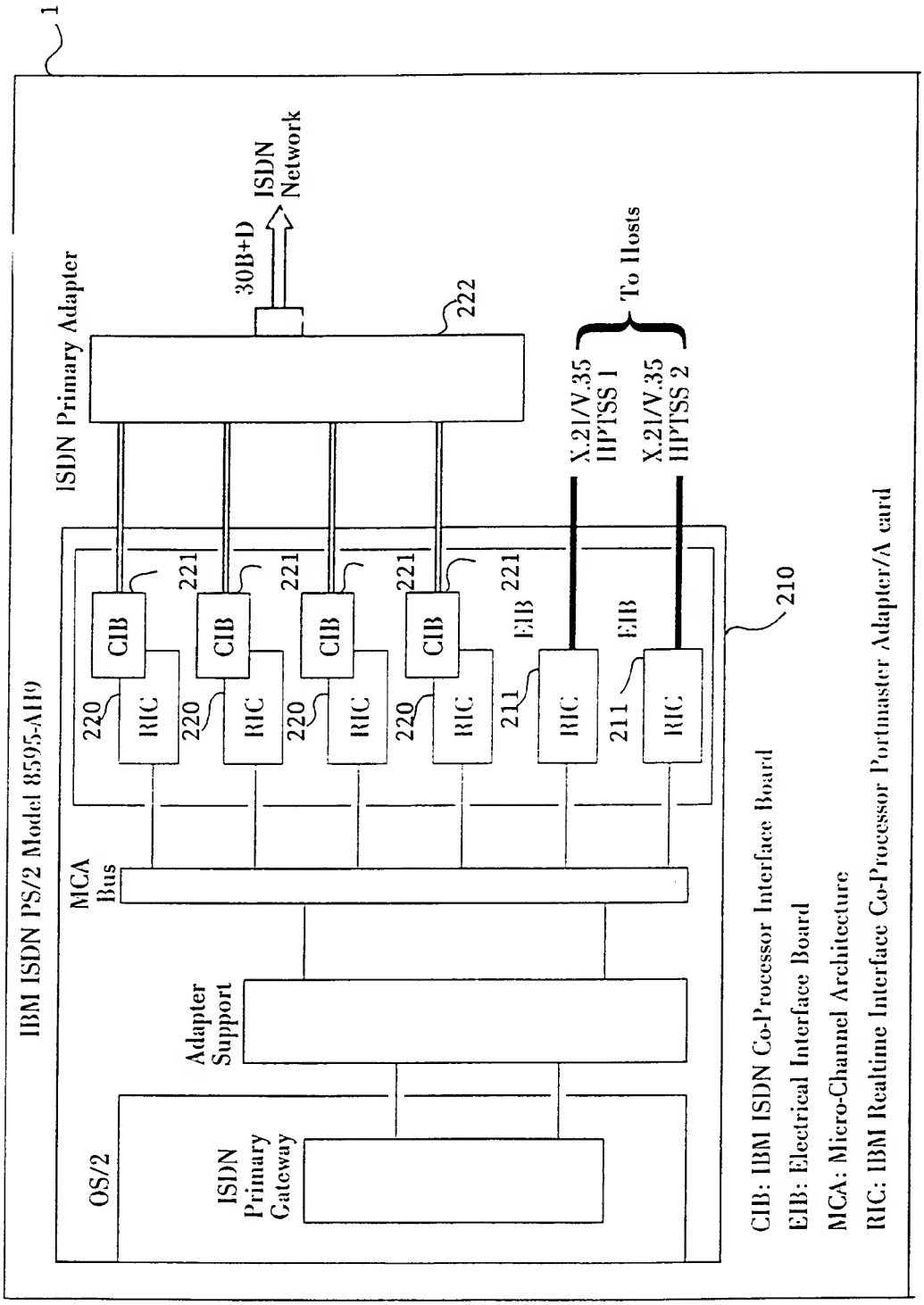
1
IBM ISDN PS/2 Model 8595-A10
ISDN Primary Adapter
30B+D
ISDN Network
222
To Hosts
X.21/V.35 HPTSS 1
X.21/V.35 HPTSS 2
CIB
RIC
220
221
EIB
211
210
MCA Bus
Adapter Support
OS/2
ISDN Primary Gateway
CIB: IBM ISDN Co-Processor Interface Board
EIB: Electrical Interface Board
MCA: Micro-Channel Architecture
RIC: IBM Realtime Interface Co-Processor Portmaster Adapter/A card

FIG.2

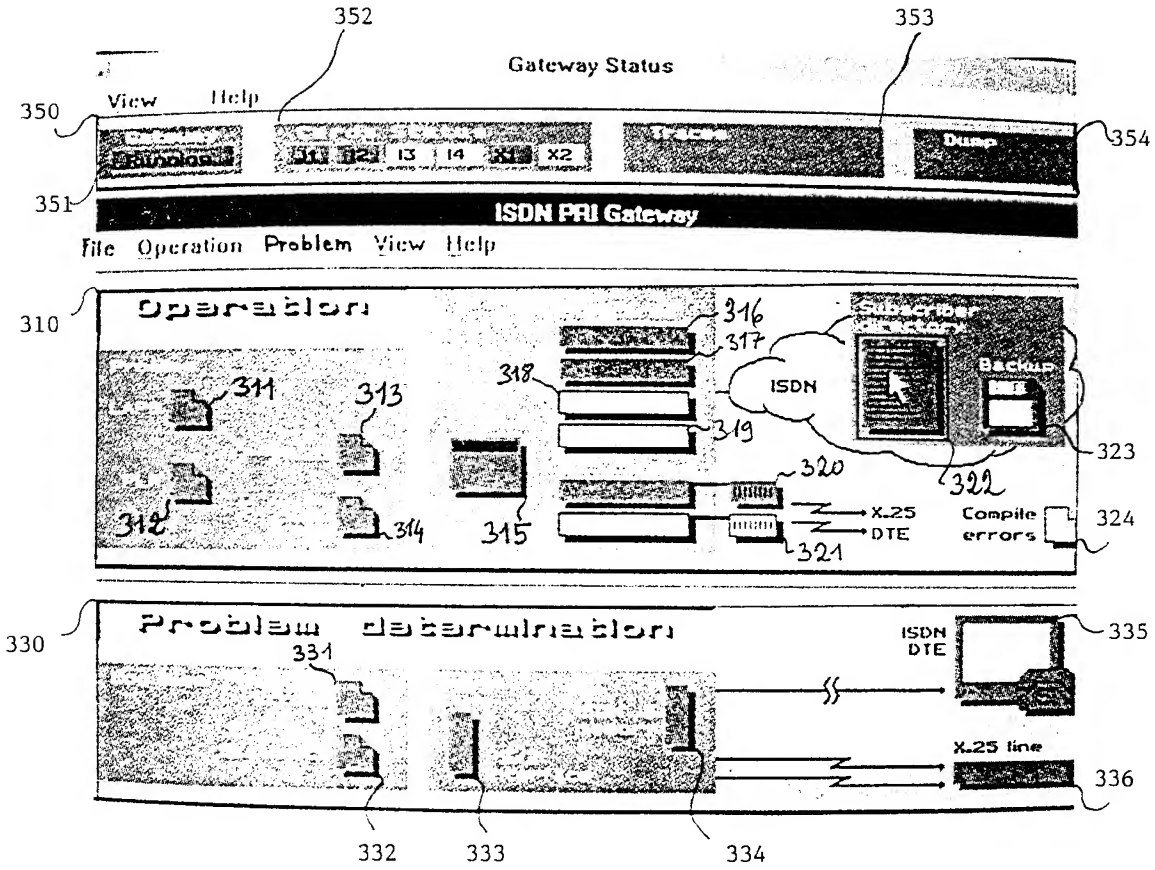
352
353
Gateway Status
View
Help
350
Dump
354
351
ISDN PRI Gateway
File Operation Problem View Help
310
Operation
316
317
318
311
313
ISDN
Backup
319
323
322
320
312
314
315
X.25
DTE
Compile
errors
324
321
330
Problem determination
331
ISDN
DTE
335
X.25 line
336
332
333
334

FIG. 3

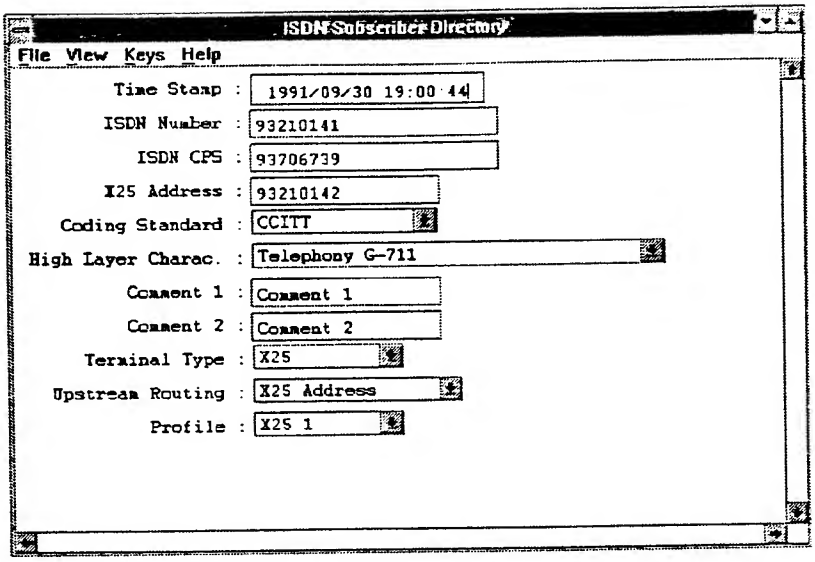
ISDN Subscriber Directory
File View Keys Help
Time Stamp : 1991/09/30 19:00:44
ISDN Number : 93210141
ISDN CPS : 93706739
X25 Address : 93210142
Coding Standard : CCITT
High Layer Charac. : Telephony G-711
Comment 1 : Comment 1
Comment 2 : Comment 2
Terminal Type : X25
Upstream Routing : X25 Address
Profile : X25 1

FIG.4a

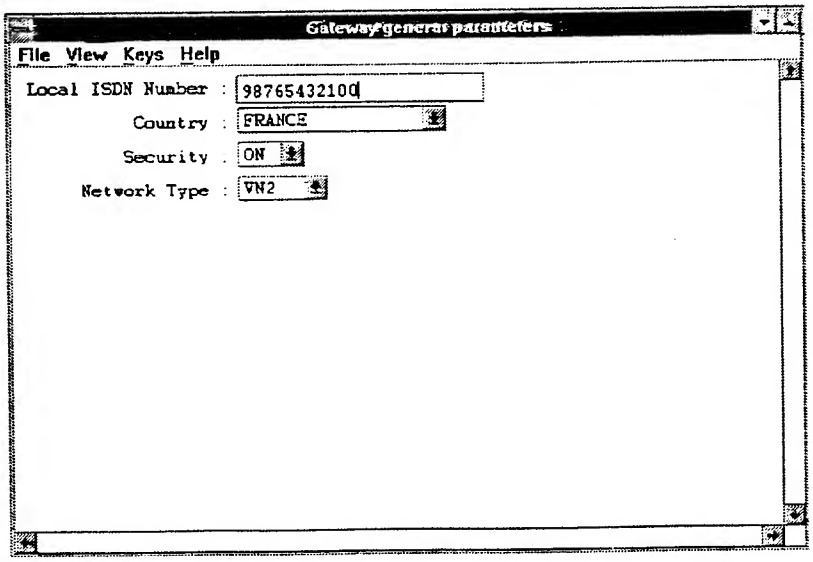
Gateway general parameters
File View Keys Help
Local ISDN Number : 98765432100
Country : FRANCE
Security : ON
Network Type : VN2

FIG.4b

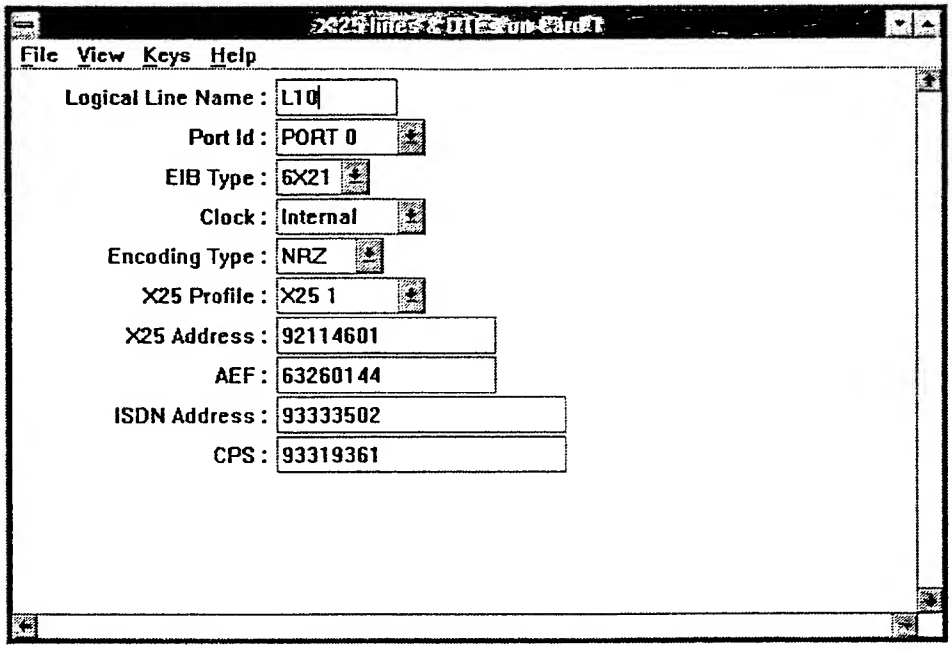
File View Keys Help
Logical Line Name : L10
Port Id : PORT 0
EIB Type : 6X21
Clock : Internal
Encoding Type : NRZ
X25 Profile : X25 1
X25 Address : 92114601
AEF : 63260144
ISDN Address : 93333502
CPS : 93319361

FIG. 4c

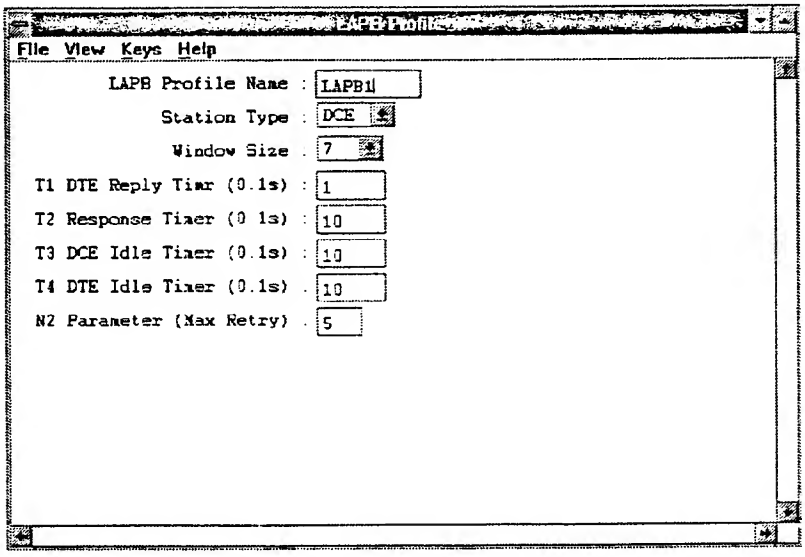
File View Keys Help
LAPB Profile Name : LAPB1
Station Type : DCE
Window Size : 7
T1 DTE Reply Timr (0.1s) : 1
T2 Response Timer (0.1s) : 10
T3 DCE Idle Timer (0.1s) : 10
T4 DTE Idle Timer (0.1s) : 10
N2 Parameter (Max Retry) : 5

FIG. 4d

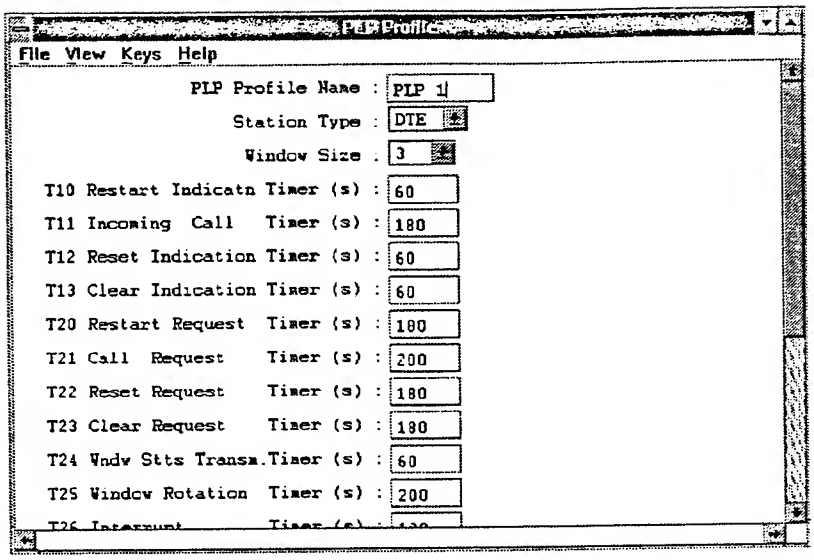
File View Keys Help
PLP Profile Name : PLP 1
Station Type : DTE
Window Size : 3
T10 Restart Indicatn Timer (s) : 60
T11 Incoming Call Timer (s) : 180
T12 Reset Indication Timer (s) : 60
T13 Clear Indication Timer (s) : 60
T20 Restart Request Timer (s) : 180
T21 Call Request Timer (s) : 200
T22 Reset Request Timer (s) : 180
T23 Clear Request Timer (s) : 180
T24 Wndw Stts Transm. Timer (s) : 60
T25 Windcw Rotation Timer (s) : 200

FIG. 4e

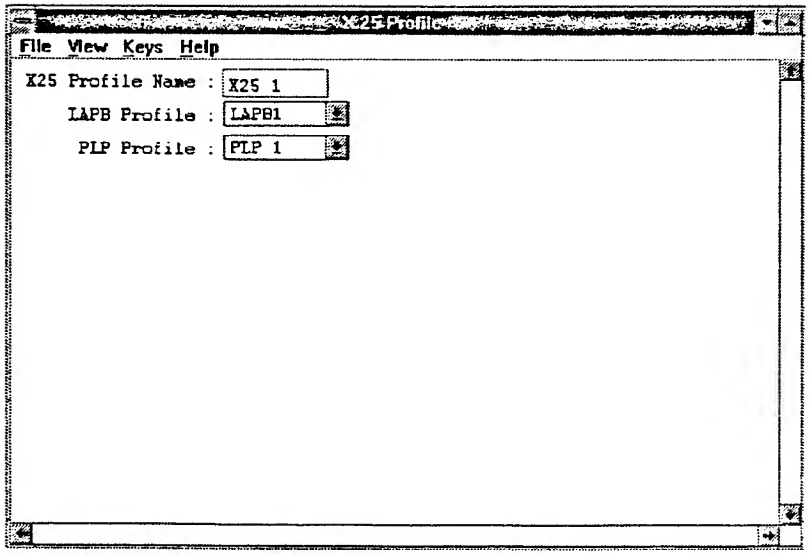
File View Keys Help
X25 Profile Name : X25 1
LAPB Profile : LAPB1
PLP Profile : PLP 1

FIG. 4f

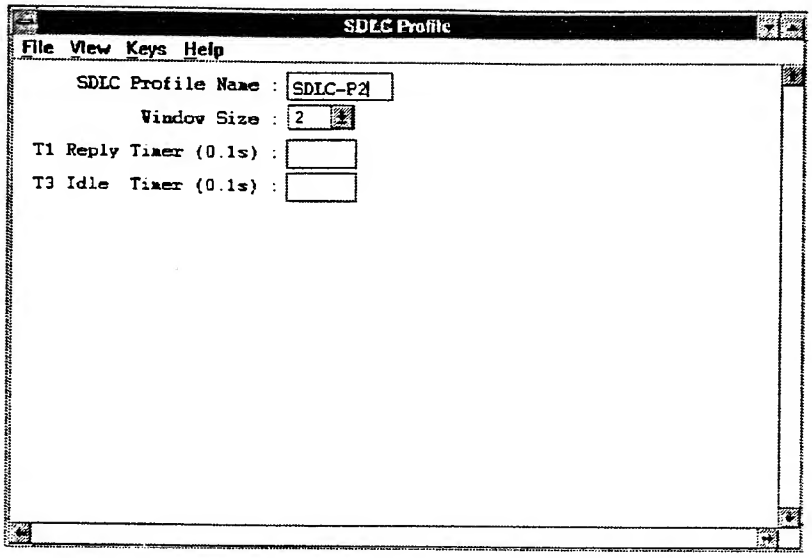
SDLC Profile
File View Keys Help
SDLC Profile Name : SDLC-P2
Window Size : 2
T1 Reply Timer (0.1s) :
T3 Idle Timer (0.1s) :

FIG. 4g

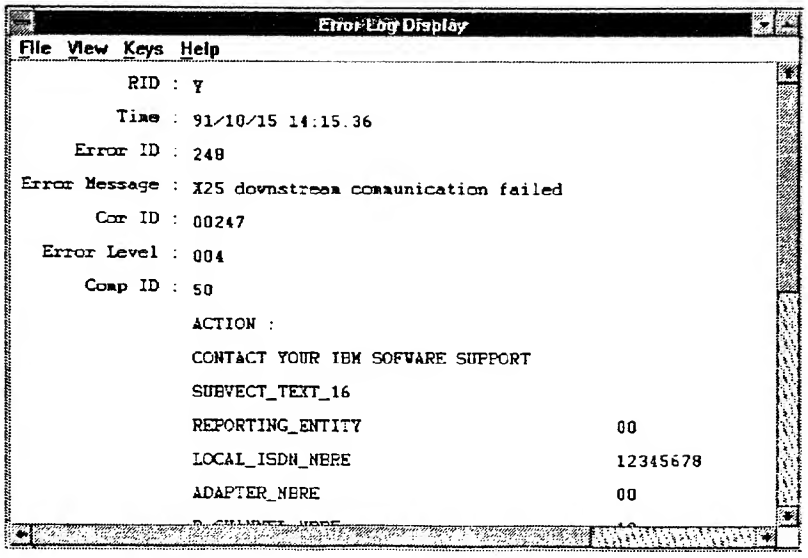
Error Log Display
File View Keys Help
RID : Y
Time : 91/10/15 14:15.36
Error ID : 248
Error Message : X25 downstream communication failed
Cor ID : 00247
Error Level : 004
Comp ID : 50
ACTION :
CONTACT YOUR IBM SOFWARE SUPPORT
SUBVECT_TEXT_16
REPORTING_ENTITY 00
LOCAL_ISDN_NBRE 12345678
ADAPTER_NBRE 00

FIG. 4h

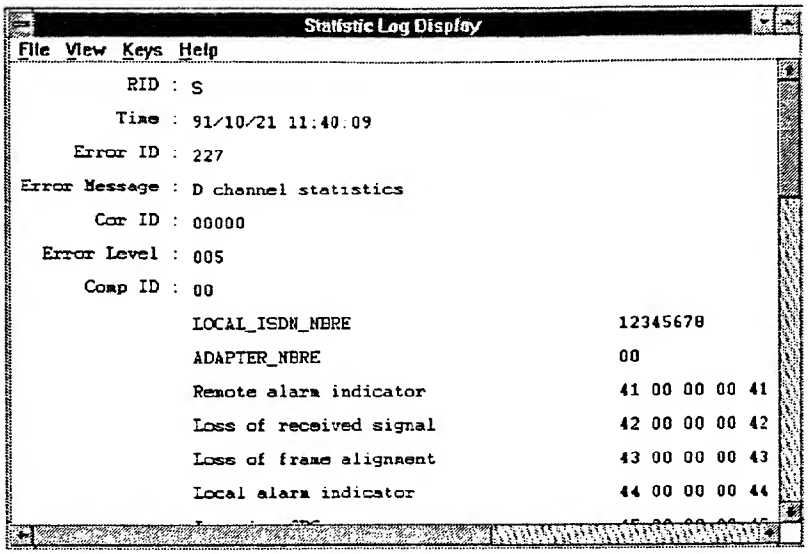

FIG.4i

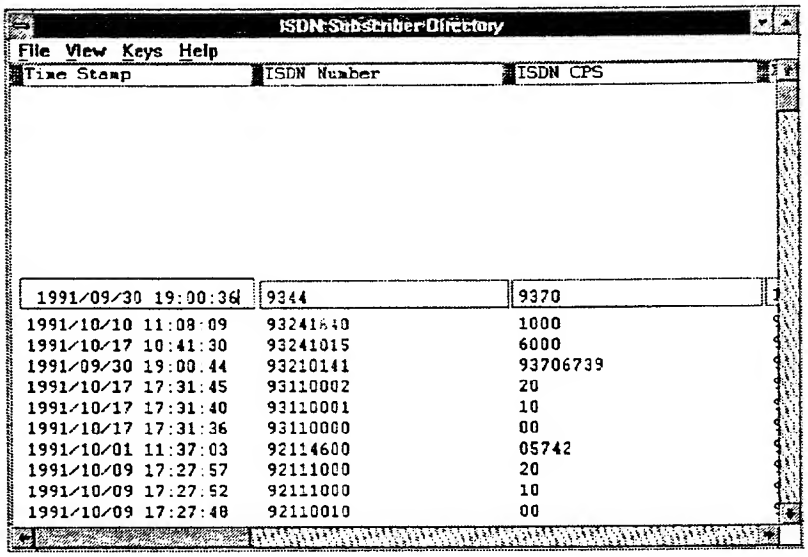

FIG.4j

FIG.5

	FILE				OPERATION						PB		VIEW	HELP
	NEW	OPEN	DELETE	EXIT	BACKUP	COMPILE	RELOAD	START	STOP	PASSWORD	TRACE	DUMP	DISPLAY STATUS	HELP
LAP.B(311)	X	X	X	X		X				X			X	X
PLP(312)	X	X	X	X		X				X			X	X
X25(313)	X	X	X	X		X				X			X	X
SDLC(314)	X	X	X	X		X				X			X	X
GATEWAY(315)		X		X		X	X	X	X	X			X	X
ISDN CARDS	X	X	X	X		X				X			X	X
X25 CARDS &LINE	X	X	X	X		X				X			X	X
SUBSCRIBER(322)	X	X	X	X		X				X			X	X
BACKUP(323)				X	X	X				X			X	X
COMPILE ERROR (324)		X		X		X				X			X	X
ERROR LOG(331)		X	X	X		X				X			X	X
STATISTICS LOG (332)		X	X	X		X				X			X	X
PS/2 INT.(333)				X		X				X	X		X	X
ISDN CIB(334)				X		X				X		X	X	X
(335)ISDN TEL				X		X				X	X		X	X
X25 LINE(336)				X		X				X	X		X	X

FIG.6

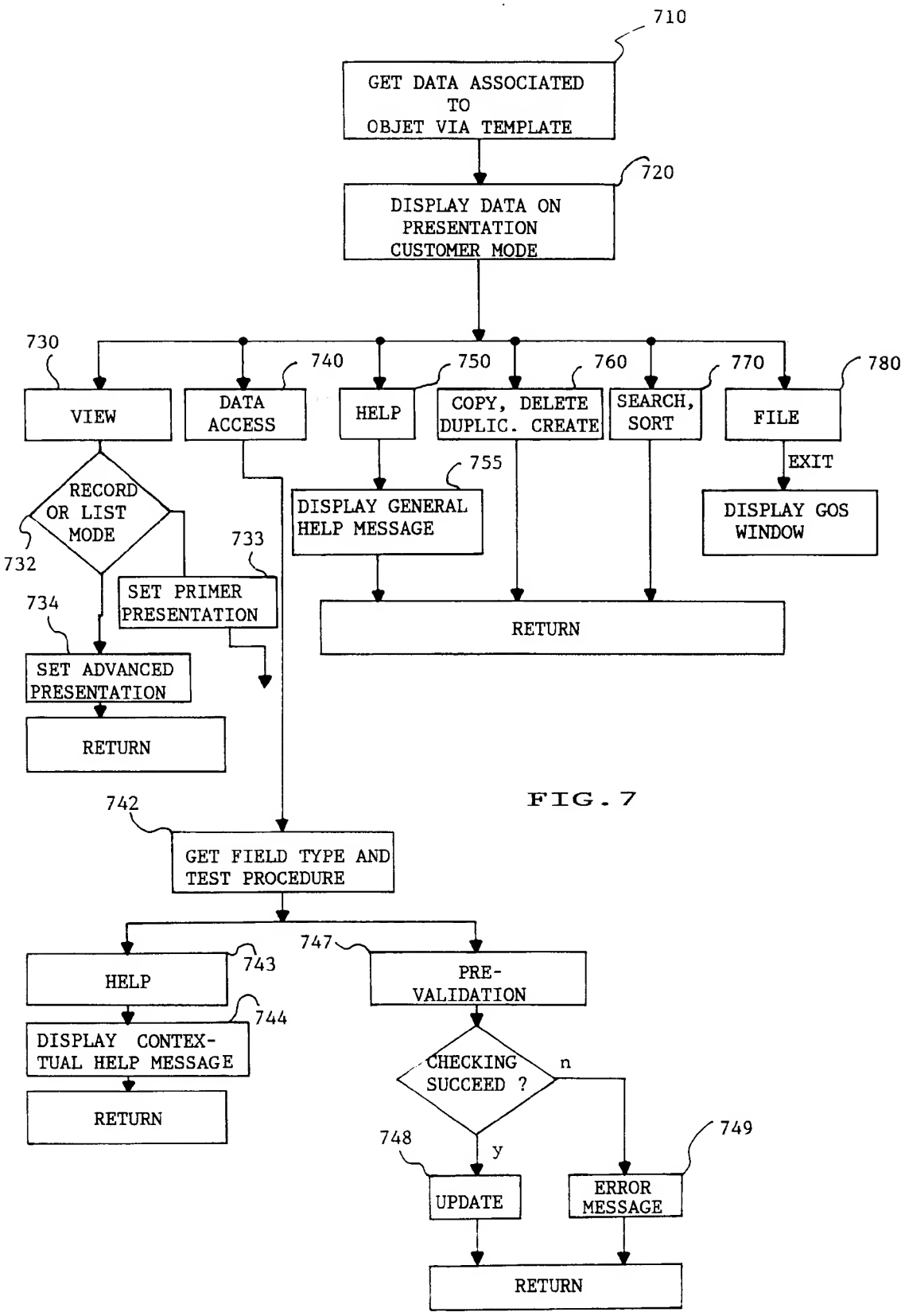
710
GET DATA ASSOCIATED TO OBJET VIA TEMPLATE
720
DISPLAY DATA ON PRESENTATION CUSTOMER MODE
730
VIEW
740
DATA ACCESS
750
HELP
760
COPY, DELETE DUPLIC. CREATE
770
SEARCH, SORT
780
FILE
EXIT
RECORD OR LIST MODE
732
733
SET PRIMER PRESENTATION
734
SET ADVANCED PRESENTATION
RETURN
755
DISPLAY GENERAL HELP MESSAGE
RETURN
DISPLAY GOS WINDOW
742
GET FIELD TYPE AND TEST PROCEDURE
HELP
743
744
DISPLAY CONTEX-TUAL HELP MESSAGE
RETURN
747
PRE-VALIDATION
CHECKING SUCCEED ?
n
y
748
UPDATE
749
ERROR MESSAGE
RETURN

FIG. 7

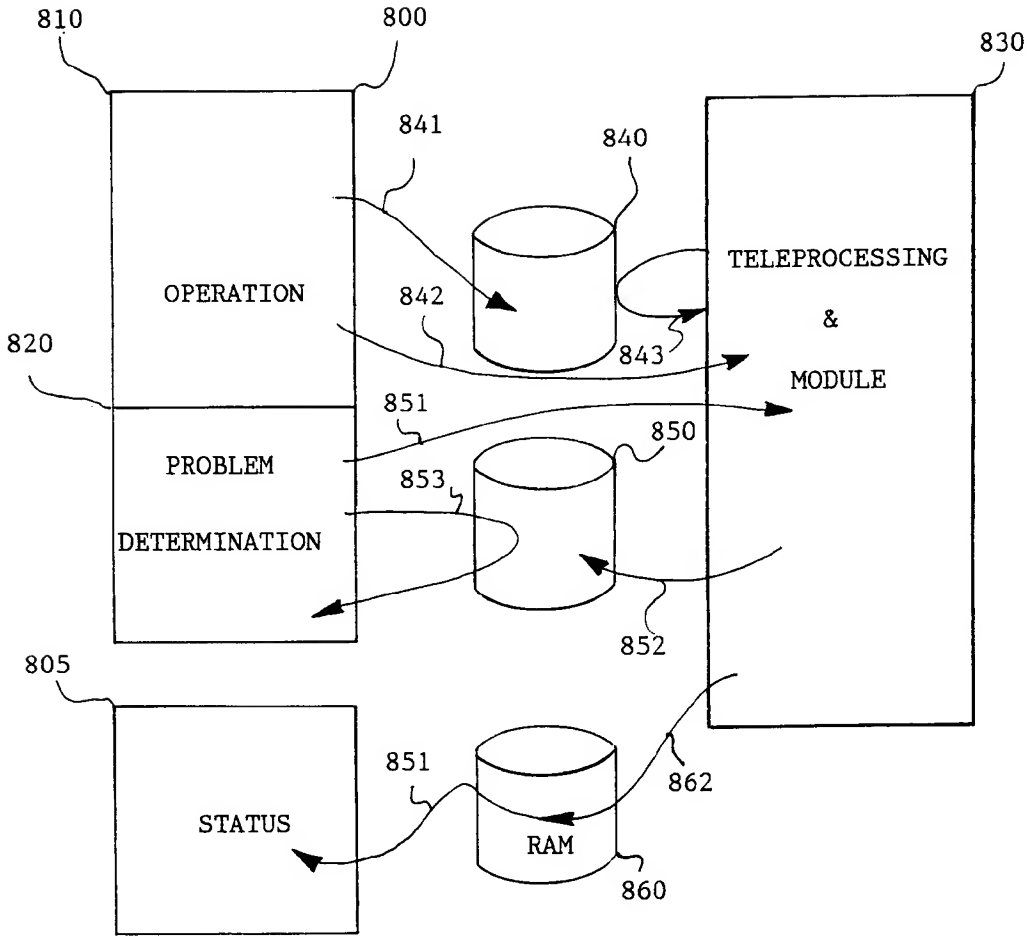
810
800
830
841
840
OPERATION
842
TELEPROCESSING
&
MODULE
820
843
851
850
PROBLEM
DETERMINATION
853
852
805
851
862
STATUS
RAM
860

FIG. 8

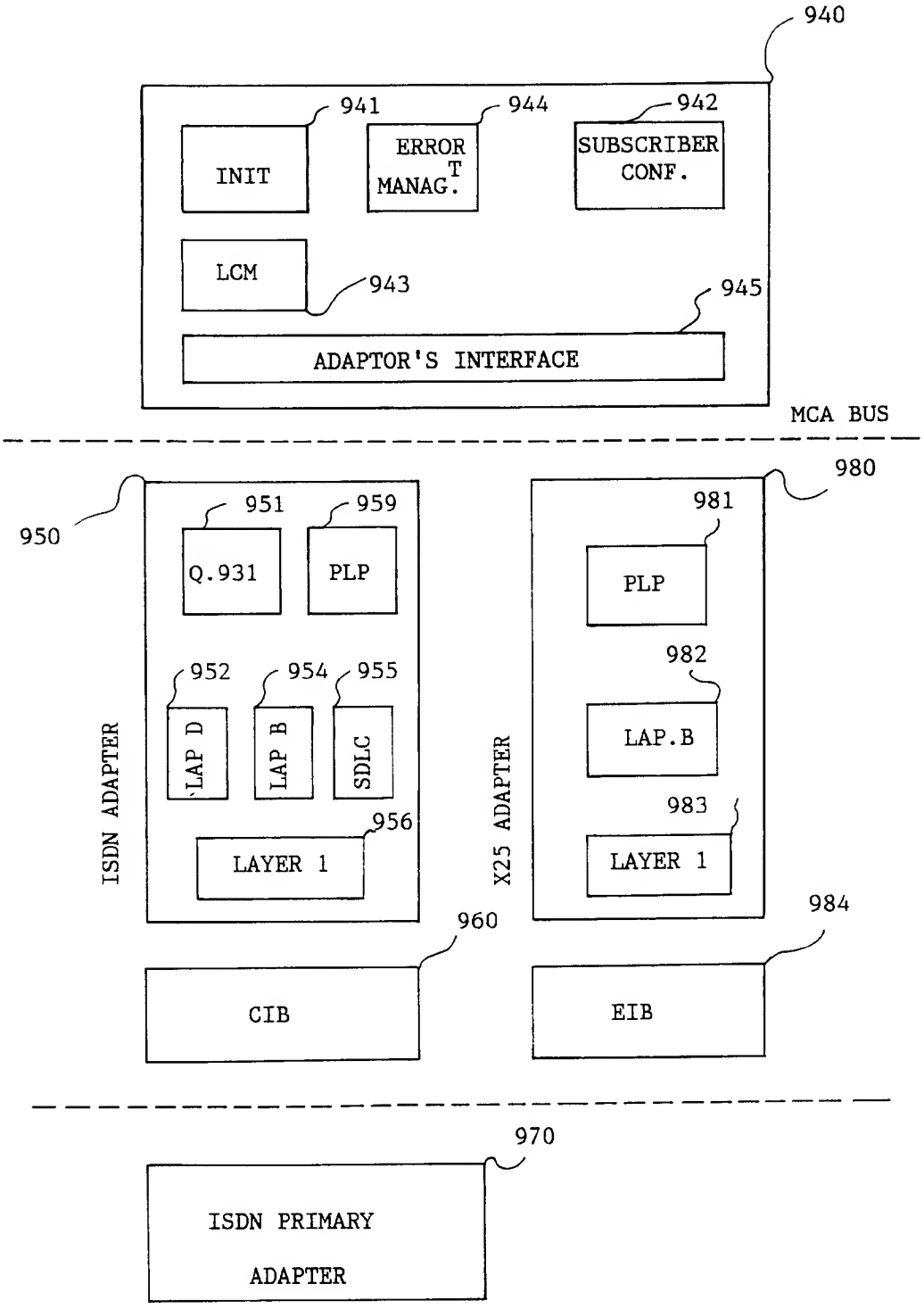
940
941
944
942
INIT
ERROR MANAG.
SUBSCRIBER CONF.
LCM
943
945
ADAPTOR'S INTERFACE
MCA BUS
980
950
951
959
981
Q.931
PLP
PLP
982
952
954
955
LAP D
LAP B
SDLC
LAP.B
ISDN ADAPTER
X25 ADAPTER
983
956
LAYER 1
LAYER 1
984
960
CIB
EIB
970
ISDN PRIMARY ADAPTER

FIG. 9

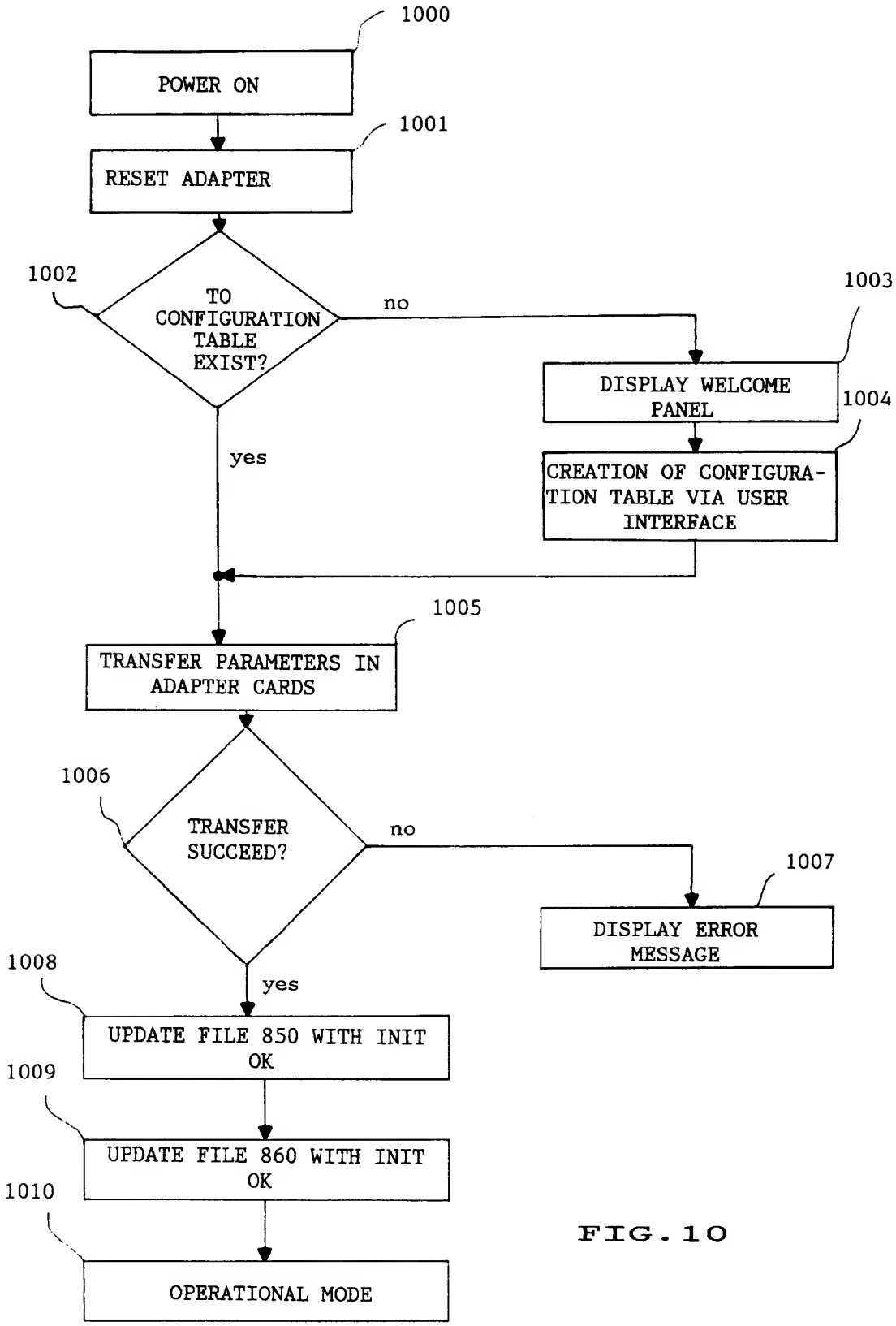
1000
POWER ON
1001
RESET ADAPTER
1002
TO CONFIGURATION TABLE EXIST?
no
1003
DISPLAY WELCOME PANEL
1004
CREATION OF CONFIGURATION TABLE VIA USER INTERFACE
yes
1005
TRANSFER PARAMETERS IN ADAPTER CARDS
1006
TRANSFER SUCCEED?
no
1007
DISPLAY ERROR MESSAGE
yes
1008
UPDATE FILE 850 WITH INIT OK
1009
UPDATE FILE 860 WITH INIT OK
1010
OPERATIONAL MODE

FIG.10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 92 48 0196

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	WO-A-9 211 724 (BELL COMMUNICATIONS RESEARCH INC.) * page 2, line 27 - page 4, line 22 * * page 5, line 15 - page 7, line 29 * * figures 1,2 *	1-10	G06F9/44 H04Q11/04
A	RESEARCH DISCLOSURE no. 292, August 1988, NEW YORK, US page 612 'Automated "WYSIWYG" Presentation of Hardware' * whole article *	1-10	
A	SDL '87 : STATE OF THE ART AND FUTURE TRENDS 1987, AMSTERDAM, NL pages 117 - 125 HONG ET AL 'SDL-Oriented Graphical Environment' * pages 118-120 : Sections 2 and 3 *	1-10	
A	EP-A-0 474 578 (IBM CORPORATION) * abstract * * column 2, line 8 - line 52 * * column 5, line 5 - column 6, line 38 * * figure 2 *	1-10	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

G06F
H04Q

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 AUGUST 1993	MCDONAGH F.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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